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09/605,334	06/27/2000	Daniel Geist	6727/0H560	3652

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Darby & Darby PC  
805 Third Avenue  
New York, NY 10022

EXAMINER

STEVENS, THOMAS H

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/605,334

Applicant(s)

GEIST ET AL.

Examiner

Thomas H. Stevens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2000 & 26 October 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 132058.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date (3)9/25/00.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1-32 are examined.

***Drawings***

2. Figure 1 discloses generic electronic devices and thus should be labeled as prior art.

***Priority***

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in Application No. 132058, filed on 09/23/1999.

***Information Disclosure Statement***

4. The listing of references on pages 1 (lines 10-13); 2 (lines 3-11 & 26-30); 15 (lines 6-12); and 21 (lines 24-27) in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A (1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." However, the examiner acknowledges their presence on the 1449 and has considered them in the prosecution; but suggests applicants remove references from the specification.

Furthermore, reference by titled Milner-R, titled "An Algebraic Definition of Simulation Between Programs" was not considered because of a missing publication date.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Katz et al., ("Have I Written Enough Properties"—A Method of Comparison Between Specification and Implementation (1998)).

Katz et al. teaches a primary analysis of model checking (pg. 1, lines 1-2).

Claim 1. A method for verification, comprising: providing an implementation model, which defines model states of a target system and model transitions between the model states; providing a specification of the target system (pg. 1, paragraphs 3 and 4), comprising properties that the system is expected to obey; creating a tableau from the specification, the tableau defining tableau states with tableau transitions between the tableau states in accordance with properties (pg. 1, lines 12-13; and pg. 4, section 3.2 1<sup>st</sup> paragraph); and comparing the tableau transitions to the model transitions to determine whether a discrepancy exists there between.

Claim 2. A method according to claim 1, wherein creating the 2 tableau comprises (pg. 4, section 3.2, lines 1-20) defining a finite state machine using a hardware description language (pg. 5, lines 8-28).

Claim 3. A method according to claim 2, wherein the implementation model has model inputs and outputs, and wherein defining the finite state machine (pg. 1, lines 12-13) comprises describing a virtual device having inputs and outputs corresponding to the model inputs and outputs of the implementation model (pg. 1, paragraph 5; and page 2).

Claim 4. A method according to claim 3, wherein comparing the transitions comprises performing a reachability analysis (pgs. 3 and 4, section 3.1, Reachable Simulation) using both the implementation model and the tableau while providing identical inputs to the inputs of both the implementation model and the tableau, and verifying that the outputs are always identical (pg. 7, section 4.3).

Claim 5. A method according to claim 4, wherein performing the reachability analysis comprises comparing the model and the tableau automatically using a model checker (pg. 8 and 9, section 5.1.3).

Claim 6. A method according to claim 4, wherein performing the reachability analysis comprises providing evidence of a tableau transition that is not implemented in the

model (pg. 8, section 5.1.3, Unimplemented Transition and pg. 4, section 3.2, lines 9-14)).

Claim 7. A method according to claim 1, wherein comparing the tableau transitions comprises associating model transitions with corresponding tableau transitions (pg. 1, line 8 and pg. 7, section 5.0, steps 1-4).

Claim 8. A method according to claim 7, wherein associating the transitions comprises defining a reachable simulation preorder relating the model (pg. 3, lines 13-17) and the tableau.

Claim 9. A method according to claim 7, wherein associating the transitions comprises finding a tableau transition that is not implemented in the model (pg. 8, section 5.1.3, Unimplemented Transition).

Claim 10. A method according to claim 9, wherein finding the tableau transition that is not implemented in the model comprises deriving an indication, based on the unimplemented transition, that the specification is not complete with respect to the model (pg. 4, section 3.2, lines 5-8).

Claim 11. A method according to claim 9, wherein finding the tableau transition that is not implemented in the model comprises deriving an indication, based on the

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unimplemented transition, that a transition of the target system is missing in the model (pg. 4, section 3.2, lines 9-14).

Claim 12. A method according to claim 1, and comprising associating model states with corresponding tableau states (pg. 1, line 8 and pg. 7, section 5.0, steps 1-4).

Claim 13. A method according to claim 12, wherein associating the model states with the corresponding tableau states comprises finding a tableau state that is not implemented in the model (pg. 5, lines 1-5).

Claim 14. A method according to claim 13, wherein finding the tableau state that is not implemented in the model comprises deriving an indication, based on the unimplemented state, that the specification is not complete with respect to the model (pg. 4, lines 5-8).

Claim 15. A method according to claim 13, wherein finding the tableau state that is not unimplemented in the model comprises deriving an indication, based on the unimplemented state, that a state of the target system is missing in the model (pg. 7, section 4.3, lines 4-6).

Claim 16. A method according to claim 12, wherein associating the model states with the corresponding tableau states comprises finding multiple model states corresponding a single tableau state (pg. 10, section 6.1, lines 1-19).

Claim 17. A method according to claim 1, wherein creating the tableau comprises creating a reduced tableau from which one or more redundant states have been eliminated (pg. 10, lines 7-9).

Claim 18. A method according of claim 1, wherein comparing the transitions comprises verifying that the specification is a complete and correct description of the implementation model responsive to the comparison (pg. 6, section 4.1, Transition Evidence).

Claim 19. A verification processor, which is configured to receive an implementation model, defining model states of a target system and model transitions between the model states (pgs. 1 and 2, paragraph 5 and 1, respectively) and to receive a specification of the target system, including properties that the system is expected to obey, and which is operative to create a tableau from the specification, the tableau defining tableau states with tableau transitions between the tableau states in accordance with the properties, and to compare the tableau transitions (pg. 1, lines 12-13; and pg. 4, section 3.2 1<sup>st</sup> paragraph) to model transitions to determine whether a discrepancy exists there between.



Claim 20. A processor according to claim 19, which is operative to perform model checking of the implementation model (pg. 3, section 3.1, lines 4 and pg. 4, lines 1-3)

Claim 21. A computer software product for verification of a specification of a target system, which specification includes properties that the system is expected to obey, by comparison with an implementation model (pg. 1, lines 17-22) which defines model states between the model states, the product comprising a computer-readable medium having computer program instructions recorded therein, which instructions, when read by a computer (pg. 9, lines 6-7), cause the computer to create a tableau from the specification, the tableau defining tableau states with tableau transitions (pg. 1, lines 12-13; and pg. 4, section 3.2 1<sup>st</sup> paragraph) between the tableau states in accordance with the properties, and to compare the tableau transitions to the model transitions to determine whether a discrepancy exists there between.

Claim 22. A product according to claim 21, wherein the program instructions cause the computer to compare the tableau with the model by running a reachability analysis using both the implementation model and the tableau while providing identical inputs to the inputs of both the implementation model and the tableau, and verifying that the outputs are always identical (pgs. 3-4, section 3.1)

Claim 23. A product according to claim 22, wherein reachability analysis is performed using an automatic model checker (pg. 9, section 5.2, lines 4-7).

Claim 24. A product according to claim 21, wherein the instructions cause the computer to verify that the specification is a complete description of the implementation model (pg. 1, lines 26-30).

Claim 25. A method for verification, comprising: providing an implementation model, which defines model states of a target system and model transitions between the model states; providing a specification of the target system (pgs. 1 and 2, paragraph 5 and 1, respectively), comprising properties that the system is expected to obey; creating a tableau from the specification, the tableau defining tableau states with tableau transitions between the tableau states in accordance with the properties (pg. 1, lines 12-13; and pg. 4, section 3.2 1<sup>st</sup> paragraph); and comparing the model and the tableau by inputting the model and the tableau to an automatic model checking program.

Claim 26. A method according to claim 25, wherein creating the tableau comprises (pg. 4, section 3.2, lines 1-20) defining a finite state machine using a hardware description language.

Claim 27. A method according to claim, 26, wherein the input model has model inputs and outputs, and wherein defining the finite state machine comprises describing (pg. 5,

lines 8-28) a virtual device having inputs and outputs corresponding to the model inputs and outputs of the implementation model.

Claim 28. A method according to claim 27, wherein comparing the model and the tableau comprises running the model checker while providing identical inputs (pg. 5, section 4 Example, lines 1-28) to the inputs of both the implementation model and the tableau, and verifying that the outputs are always identical.

Claim 29. A method according to claim 25, wherein comparing the model and the tableau comprises providing evidence of a transition or state in the tableau that is not implemented in the model (pg. 7, section 4.3).

Claim 30. A method according to claim 29, wherein providing the evidence comprises providing a counter-example indicative of the unimplemented transition or state (pg. 7, section 4.4).

Claim 31. Model checking apparatus, which is configured to receive an implementation model, defining model states of a target system and model transitions between the model states, and to receive a specification of the target system (pg. 1, paragraphs 3. and 4), including properties that the system is expected to obey, and which is operative to create a tableau from the specification, the tableau defining tableau states with tableau transitions between the tableau states in accordance with the properties (pg. 1,

lines 12-13; and pg.4, section 3.2 1<sup>st</sup> paragraph) and to compare the tableau to the model by inputting the model and the tableau to an automatic model checking program (pg.9, section 5.2, lines 4-7).

Claim 32. A computer software product for verification of a specification of a target system (pg. 1, paragraphs 3 and 4), which specification includes properties that the system is expected to obey, by comparison with an implementation model, which defines model states of the target system and model transitions between the model states, the product comprising a computer-readable medium having computer program instructions recorded therein, which instructions, when read by a computer (pg. 9, lines 4-9), cause the computer to create a tableau from the specification, the tableau defining tableau states with tableau transitions between the tableau states (pg. 1, lines 12-13; and pg. 4, section 3.2 1<sup>st</sup> paragraph) in accordance with the properties, and to compare the tableau to the model by inputting the model and the tableau to an automatic model checking program.

#### ***Correspondence Information***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Stevens whose telephone number is (703) 305-0365, Monday-Friday (8:30 am- 5:30 pm) or contact Supervisor Mr. Kevin Teska at (703) 305-9704. The fax number for the group is 703-872-9306.

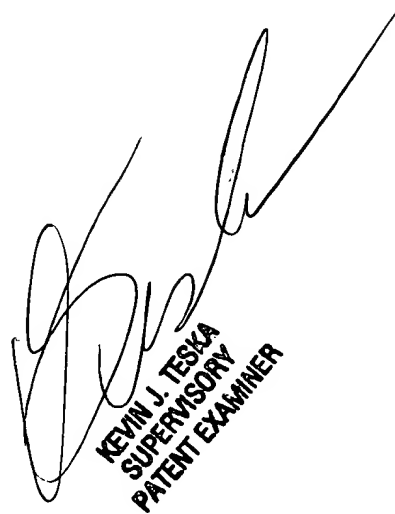
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Any inquires of general nature or relating to the status of this application should be directed to the Group receptionist whose phone number is (703) 305-3900.

May 12, 2004

THS



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